UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,480	03/28/2005	Tatsuya Igari	450100-04782	6753

7590 01/31/2008

William S Frommer
Frommer Lawrence & Haug
745 Fifth Avenue
New York, NY 10151

EXAMINER	
TORRES, JOSE	

ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
01/31/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/529,480	IGARI ET AL.	
	Examiner	Art Unit	
	José M. Torres	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/28/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Comments

1. The Preliminary Amendment filed on March 28, 2005 has been entered and made of record.

Specification

2. The disclosure is objected to because of the following informalities:

- Page 12 line 25: "frame memory 32" should be -- frame memory 33 --
- Page 38 lines28-29: "with other pixels turned into black pixels." Should be -- with other pixels turned into black pixels as shown in FIG. 22 --

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claim 8 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claim limitation "A program" is intended to claim non-statutory subject matter because a program *per se* is functional descriptive material not being embodied on a computer-readable medium. Such a limitation is only statutory when claimed as a computer-readable medium storing the program which causes a computer to perform the functionality of the program

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 2, 4, 6 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Higurashi (U.S. Pat. No. 6,393,162).

Re claim 1: Higurashi disclose an image processing apparatus for generating a wide-angle picture ("Apparatus for forming a panoramic image (having wide-angle of view)") by overlapping a first picture captured from a first visual point and a second picture, including a part of the first picture ("overlap"), captured from a second visual point different ("Photographing Direction Changed") from the first visual point so that said parts are overlapped, said image processing

apparatus is characterized by comprising: detecting means (FIG. 1, "Angle-of-View Calculating Portion **30**") of detecting an overlap portion of the first picture with the second picture within the wide-angle picture (Col. 7 lines 45-53 and Col. 8 lines 12-28); comparing means (FIG. 4, "Comparison-Region Setting Portion **41**") of comparing pixel values between pixels of the first and the second pictures in the overlap portion (Col. 9 lines 20-41 and line 64 through Col. 10 line 26); and splicing means (FIG. 6, "Image Synthesizing Portion **6**") of performing a splicing by shifting the overlap portion of the first picture with the second picture in correspondence with a result of the comparison by the comparing means (Col. 11 lines 14-28 and line 65 through Col. 12 line 20).

Re claim 2: Higurashi disclose a difference calculating means of calculating absolute values of differences in pixel values between the first and the second picture pixels identical in position on the wide-angle pictures in the overlap portion, wherein the comparing means compares the pixel values between the pixels of the first and the second pictures in the overlap portion by comparing the absolute values, calculated by the difference calculating means, of the differences in pixel values between the first and the second picture pixels identical in position on the wide-angle pictures in the overlap portion with a prescribed threshold (The Correlation Calculation Portion **43** calculates the absolute values of the difference and then uses this value to compare it against its minimum (e.g. threshold), see Col. 9 line 20 through Col. 10 line 26).

Re claim 4: Higurashi disclose median detecting means of calculating medians within the absolute values of the differences in pixel values between the first and the second picture pixels identical in position on the wide-angle pictures in the overlap portion, wherein the comparing means compares the pixel values between the pixels of the first and the second pictures in the overlap portion by comparing the medians, detected by the median detecting means, within the absolute values of the differences in pixel values between the first and the second picture pixels identical in position on the wide-angle pictures in the overlap portion with a prescribed threshold (Similar to claim 2 above, the embodiment disclose in Col. 15 line 20 through Col. 16 line 28, the dispersion of the pixels σ_L^2 and σ_R^2 are used and compared with the value a_{after}).

Re claim 6: Higurashi disclose an image processing method of an image processing apparatus for generating a wide-angle picture by overlapping a first picture captured from a first visual point and a second picture, including a part of the first picture, captured from a second visual point different from the first visual point so that said parts are overlapped, said image processing method comprising: a detection step of detecting an overlap portion of a first picture with a second picture within wide-angle pictures (Col. 7 lines 45-53 and Col. 8 lines 12-28); a comparison step of comparing pixel values between pixels of the first and the second pictures in the overlap portion (Col. 9 lines 20-41 and line 64

through Col. 10 line 26); and a splicing step of performing a splicing through a shifting of the overlap portion of the first picture with the second picture in correspondence with a result of comparison obtained by a processing in the comparison step.

Re claim 7: Higurashi disclose a recording medium (FIG. 1, "Image Processing Portion **21** and Memories") characterized on which a program is recorded in a computer readable form, wherein said program controls an image processing apparatus for generating a wide-angle picture by overlapping a first picture captured from a first visual point and a second picture, including a part of the first picture, captured from a second visual point different from the first visual point so that said parts are overlapped, said program comprising: a detection step of detecting an overlap portion of a first picture with a second picture within wide-angle pictures; a comparison step of comparing pixel values between pixels of the first and the second pictures in the overlap portion; and a splicing step of performing a splicing through a shifting of the overlap portion of the first picture with the second picture in correspondence with a result of comparison obtained by a processing in the comparison step (Col. 11 lines 14-28 and line 65 through Col. 12 line 20).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Higurashi in view of Yoshihara et al. (U.S. Pat. No. 5,465,163). The teachings of Higurashi have been discussed above.

As to claim 3, Higurashi does not explicitly disclose logarithm transformation means of performing a logarithm transformation of the absolute values of the differences in pixel values between the first and the second picture pixels identical in position on the wide-angle pictures in the overlap portion, wherein the comparing means compares the pixel values between the pixels of the first and the second pictures in the overlap portion by comparing a value obtained by the logarithm transformation means through the logarithm transformation of the absolute values of the differences in pixel values between the first and the second picture pixels identical in position on the wide-angle pictures in the overlap portion with a predetermined threshold.

Yoshihara et al. teaches a Preprocessing Unit **102** shown in FIG. 14, performing a logarithm transformation of the first and second image data in the overlap portion, a Characteristic Extraction Unit **108** generating characteristic data in an easily-comparable form, and a Characteristic Comparison Unit **108** finding coincidences between images (Col. 11 line 5 through Col. 12 line 48).

Higurashi teaches various embodiments for the detection of positional relationship between image such as the absolute value of the differences and the use of the standard deviations and dispersion values. Since the teachings in Yoshihara et al. are directed towards the same type of image processing performed by Higurashi ("Synthesizing Multiple Images"), the use of the logarithmic transformation and the comparison for determining the amount of shift, are just another method for the synthesis of images. Therefore, in view of Yoshihara et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Higurashi by incorporating the preprocessing unit, the characteristic extraction unit and the characteristic comparison unit to logarithmically transforming the absolute values of the differences and extracting this value as the easily-comparable characteristic data and comparing it to a predetermined threshold such as the value of a preceding/succeeding image in an overlapping portion in order to obtain a different type of data (log) while doing the comparison analysis, thereby providing a different option as to the data being processed by the image processor.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Higurashi in view of Herman et al. (U.S. Pat. No. 6,075,905). The teachings of Higurashi have been discussed above.

As to claim 5, Higurashi does not explicitly disclose edge extracting means of extracting edges from the first and the second pictures, wherein the comparing means compares the pixel values between the pixels of the first and the second pictures in the

overlap portion by comparing the edges, extracted by the edge extracting means, of the first and the second pictures in the overlap portion.

Herman et al. teaches edge extracting means of extracting edges from the first and the second pictures, wherein the comparing means compares the pixel values between the pixels of the first and the second pictures in the overlap portion by comparing the edges, extracted by the edge extracting means, of the first and the second pictures in the overlap portion (Input images are filtered to extract edges and compare it on a pixel-by-pixel basis, see Col. 21 lines 40-56.).

Therefore, in view of Herman et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Higurashi by incorporating the filtering to extract the edges of the images and comparing the pixels of the edges extracted in the overlap portion in order to generate a pyramid structure (coarse-fine alignment) in which the low resolution pyramid levels preserve sufficient image structure to allow accurate alignment (Col. 21 lines 27-39).

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Higurashi.

As to claim 8, Higurashi teaches an image processing apparatus for generating a wide-angle picture by overlapping a first picture captured from a first visual point and a second picture, including a part of the first picture, captured from a second visual point different from the first visual point so that said parts are overlapped, said computer executing: a detection step of detecting an overlap portion of a first picture with a second picture within wide-angle pictures; a comparison step of comparing pixel values

between pixels of the first and the second pictures in the overlap portion; and a splicing step of performing a splicing through a shifting of the overlap portion of the first picture with the second picture in correspondence with a result of comparison obtained by a processing in the comparison step (Refer to claims 1, 6 and 7 above.).

However, Higurashi does not explicitly disclose a program executable by a computer.

Higurashi does teach the use of software for the generation of panoramic images (Col. 2 lines 36-46). Therefore, in view of Higurashi, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the computer executable steps as software in order to provide an easy implementation of the invention in such a way that it is known to a person of ordinary skill in the art.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Komiya et al. disclose an Image Processing Apparatus, Inoue disclose an Image Processing Apparatus, Image Processing Method, and Recording Medium and Sandini et al. disclose a Direct Omnidirectional Imaging Based on a Retina-like Sensor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José M. Torres whose telephone number is 571-270-1356. The examiner can normally be reached on Monday thru Friday: 8:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JMT
01/24/2008

JINGGE WU
SUPERVISORY PATENT EXAMINER